भारतीय मानक
Indian Standard

IS 1163 : 2023

चॉकलेट — विशिष्टि

(तीसरा पुनरीक्षण)

Chocolates — Specification

(Third Revision)

ICS 67.140.30

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June 2023 Price Group 9

Stimulant Foods Sectional Committee, FAD 06

FOREWORD

This Indian Standard (Third Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Stimulant Foods Sectional Committee had been approved by the Food and Agriculture Division Council.

The organoleptic evaluation of the quality of chocolates is based essentially on its smoothness, taste, and flavour. To give a smooth lasting effect, a high cocoa butter content and disintegration of cocoa matter and sugars to a very fine size are essential so that the full flavour of the chocolate becomes apparent. In tropical countries, however, there is limitation to the content of cocoa butter because of its low melting point and consequent tendency to separate out. To overcome this, certain emulsifiers, such as, lecithins are added.

This standard was first published in 1958 covering requirements for chocolates manufactured for covering purposes only. In 1971, the standard was revised and other types of chocolates were incorporated. The standard was further revised in 1992 to incorporate the new varieties manufactured in the country which included filled, composite and white chocolates. In addition, other processed food items covered under other Indian Standards were excluded from the purview of this standard, such as chocolate biscuits (*see* IS 1011 'Biscuits — Specification'), chocolate wafers (*see* IS 2397 'Specification for wafers') and chocolate ice-cream (*see* IS 2802 'Specification for ice-cream'), etc.

This revision is being undertaken to align the requirements of chocolates with the specifications laid down in the *Food Safety and Standards* (*Food Products Standards and Food Additives*) *Regulations,* 2011. Accordingly, product description has been updated and list of raw materials and permitted ingredients has been revised.

In the formulation of this standard, due consideration has been given to the provisions of the *Food Safety and Standards Act*, 2006 and the *Rules* and *Regulations* framed thereunder and the *Legal Metrology* (*Packaged Commodities*) *Rules,* 2011. However, this standard is subject to the restrictions imposed under these, wherever applicable.

The composition of the Committee responsible for formulation of the standard is given in Annex L.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

CHOCOLATES — SPECIFICATION

(Third Revision)

1 SCOPE

This standard prescribes the requirements and methods of sampling and test for chocolates.

2 REFERENCES

The standards listed in Annex A contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of these standards.

3 TYPES

3.1 Chocolate is the generic name for the homogeneous products obtained by an adequate process of manufacture from a mixture of one or more of the ingredients like cocoa solids (which include cocoa beans, cocoa nib, cocoa mass (cocoa liquor/cocoa paste), cocoa press cake and cocoa powder (cocoa fines or cocoa dust), including fat reduced cocoa powder with or without addition of sugars, milk solids including milk fat, cocoa butter, sugars and/or sweeteners, salt, spices and condiments, flavors and flavoring substances and other food ingredients suitable to the product. The material

a) Milk chocolate;
b) Milk covering chocolate;
c) Plain chocolate;
d) Plain covering chocolate;
e) Blended chocolate;
f) White chocolate;
g) Filled chocolate;
h) Composite chocolate;
j) Praline; and
k) Couverture chocolate.

3.1.1 *Milk Chocolate*

Milk chocolate is the homogeneous product obtained by an adequate process of manufacture from one or more of cocoa nib, cocoa mass, cocoa press cake, cocoa powder including low-fat cocoa powder with sugar and milk solids including milk fat and cocoa butter. Milk solids refers to the addition of milk ingredients in their natural proportion except that milk fat may be added or removed.

3.1.2 *Milk Covering Chocolate*

Milk chocolate as defined in **3.1.1**, but suitable for covering purposes.

3.1.3 *Plain Chocolate*

Plain chocolate is the homogeneous product obtained by an adequate process of manufacture from one or more of cocoa nib, cocoa mass, cocoa press cake, cocoa powder including low fat cocoa powder with sugar and cocoa butter. Provided that dark chocolate shall contain, on a dry matter basis, not less than 35 percent. total cocoa solids, of which not less than 18 percent shall be cocoa butter and not less than 14 percent fat-free cocoa solids.

3.1.4 *Plain Covering Chocolate*

Plain chocolate as defined in **3.1.3**, but suitable for covering purposes.

3.1.5 *Blended Chocolate*

Blended chocolate is a blend of milk chocolate and plain chocolate in varying proportions.

3.1.6 *White Chocolate*

White chocolate means a homogeneous product made from cocoa butter, milk solids including milk fat and sugar.

3.1.7 *Filled Chocolate*

Filled chocolate is a product having an external coating of chocolate with a centre clearly distinct in its composition from the external coating, but does not include flour confectionery, pastry and biscuit products.

3.1.8 *Composite Chocolate*

Composite chocolate is a product containing at least 60 percent of chocolate by mass and edible wholesome substances such as fruits, nuts and raisins.

3.1.9 *Praline*

Praline is a product in a single mouthful size, where the amount of the chocolate component shall not be

less than 25 percent of the total mass of the product; the product shall consist of either filled chocolate or a single or combination of the chocolate specified under **3.1**.

3.1.10 *Couverture Chocolate*

Couverture chocolate is a product containing, on a dry matter basis, not less than 35 percent total cocoa solids of which not less than 31 percent shall be cocoa butter and not less than 2.5 percent fat-free cocoa solids.

4 OPTIONAL INGREDIENTS

4.1 In addition to the ingredients given under 3, the chocolates may contain one or more of the substances given below:

a) Edible salt (conforming to IS 7224);
b) Spices and condiments and their extracts;
c) Vitamins and minerals; and
d) Food additives permitted under the *Food Safety and Standards* (*Food Products Standards and Food Additives*) *Regulations,* 2011.

4.2 Any vegetable fat complying with the relevant Indian Standards, may be used, singly or in blends, as cocoa butter equivalent and shall comply with the following:

a) They are non–lauric vegetable fats, which are rich in symmetrical monounsaturated triglycerides of the type POP (palmitic acid-oleic acid-palmitic acid), POSt (palmitic acid-oleic acid-stearic acid) and StOSt (stearic acid-oleic acid-stearic acid);
b) They are miscible in any proportion with cocoa butter and are compatible with its physical properties (melting point and crystallization temperature, melting rate, need for tempering phase); and
c) They are obtained by the process of refining and/or fractionation, which excludes enzymatic modification of the triglyceride structure.

NOTE — In case Indian Standards are not available for the vegetable fat being used as cocoa butter equivalent, these shall comply with the requirements laid down under the *Food Safety and Standards* (*Food Products Standards and Food Additives*) *Regulations*, 2011.

5 REQUIREMENTS

5.1 Description

5.1.1 The product shall be a smooth homogeneous cocoa product obtained from a mixture of one or more of the ingredients like cocoa solids (which include cocoa beans, cocoa nib, cocoa mass (cocoa liquor/cocoa paste), cocoa press cake and cocoa powder (cocoa fines or cocoa dust), including fat reduced cocoa powder with or without addition of sugars, milk solids including milk fat, cocoa butter, sugars and/or sweeteners, salt, spices and condiments, flavors and flavoring substances and other food ingredients suitable to the product.

5.1.2 The addition of vegetable fats other than cocoa butter shall not exceed 5 percent of the finished product, after deduction of the total mass of any other added edible foodstuffs, without reducing the minimum contents of cocoa materials. The nature of the vegetable fats permitted for this purpose is specified in **4.2**.

5.1.3 The product may contain isomaltulose at 50 percent (*max*) of the total sugars without adversely affecting the stability of the product.

5.1.4 The product shall have a colour, taste and flavour characteristic of good chocolate and shall be free from rancidity or other off odour, insect and fungus infestation, filth, adulterants, and harmful or injurious foreign matter.

5.2 Milk Chocolates, Plain Chocolates and White Chocolates

The product shall also comply with the requirements given in Table 1.

5.3 Filled Chocolate

5.3.1 In the case of filled chocolates (*see* **3.1.7**), the coating shall be made of chocolate that meets the requirements of one or more of the chocolate types listed under **3.1.1** to **3.1.6**.

5.3.2 The amount of chocolate component of the coating shall not be less than 25 percent of the total mass of the finished product, when tested by the method given in Annex F; centre filling(s) or component(s) shall comply with the requirements specified under this standard.

5.4 Composite Chocolate

5.4.1 Composite chocolate shall not contain less than 60 percent (*m/m*) of chocolate which meets the requirements of one or more of the chocolate types listed under **3.1.1** to **3.1.6**.

5.4.2 The chocolate shall contain one or more edible wholesome substances such as fruits, nuts and raisins which shall not be less than 10 percent of the total mass of the finished product, when determined by the method given in Annex G.

5.5 The chocolates shall also comply with the microbiological requirements laid down in Table 2.

5.6 Hygienic Conditions

The product covered by the provisions of this standard shall be manufactured, packed and stored under hygienic conditions in licensed premises (*see* IS 2491).

6 PACKING AND MARKING

6.1 Packing

The bulk chocolates shall be packed in clean, sound and odour-free containers made of tin-plate, plastic, greaseproof paper, aluminium foil, cellulose film or other suitable flexible packing material (food grade) as agreed to between the purchaser and the vendor. In case of moulded chocolates bars, each unit of chocolate shall be wrapped in aluminium foil, printed or otherwise, and may be lined with glassine or greaseproof paper. Such units may be overwrapped. These units, in turn, shall be collectively packed in clean and odour-free cartons.

6.2 Marking

6.2.1 The following particulars shall be clearly and indelibly marked on the label of each container:

a) Name of the material, including the type;
b) Name and address of manufacturer or packer;
c) Batch or code number;
d) Net quantity;
e) List of ingredients in descending order of composition;
f) Declaration of:
    1) Minimum cocoa content except in case of white chocolates (optional);
    2) Milk solids content in case of milk chocolates and white chocolates (optional); and
    3) In the case of filled chocolate, the type of chocolate of which the coating is made and the nature of centre to be specified.
g) Date of manufacturing;
h) Expiry date/Use by;
j) The words 'Best before_____' (date to be decided by the manufacturer) (optional);
k) In case of chocolate which contain vegetable fats other than cocoa butter, it shall have the following label declaration in bold: "CONTAINS VEGETABLE FAT IN ADDITION TO COCOA BUTTER"; and
m) Any other information required under the *Legal Metrology* (*Packaged Commodities*) *Rules,* 2011 and the *Food Safety and Standards* (*Labelling and Display*) *Regulations,* 2020.

NOTE — The manner of declaration of date of manufacture/Expiry/Use by/Best Before shall be as follows: the day, month and year using the DD/MM/YY format for products with a short shelf life of up to 3 months; the month and the year for products with a shelf life of more than three months, shall be declared in un-coded numerical sequence except that the month shall be indicated by capital letters and abbreviations (at least first three letters of the month) may be used. Provided that for products with shelf life of more than three months, the "DD/MM/YY" format may also be used.

6.2.2 *BIS Certification Marking*

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.

7 SAMPLING

Representative samples of the product shall be drawn and criteria for ascertaining conformity of the material to the requirements of the specification shall be as prescribed in Annex K.

Table 1 Chemical Requirements for Chocolates
(*Clause* 5.2)

Sl No.	Characteristics	Requirements for						Method of Test, Ref to
		Milk Chocolate	Milk Covering Chocolate	Plain Chocolate	Plain Covering Chocolate	White Chocolate	Blended Chocolate	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	Total fat (on dry basis) percent by mass, *Min*	25	25	25	25	25	25	Annex B
ii)	Milk fat (on dry basis) percent by mass, *Min*	2	2	—	—	2	—	Annex C
iii)	Cocoa solids (on Moisture-free and fat free basis) percent by mass, *Min*	2.5	2.5	12	12	—	3.0	*see* NOTE
iv)	Milk Solids (on Moisture-free and fat-free basis) percent by mass							Annex D
	Min	10.5	10.5	—	—	10.5	1 – 9 (range)	
	Max	—	—	—	—	—		
v)	Sugar (sucrose) (on dry basis), percent by mass, *Max*	55	55	60	60	55	60	Annex E
vi)	Acid insoluble ash (on moisture fat and sugar free basis) percent by mass, *Max*	0.2	0.2	0.2	0.2	0.2	0.2	Annex F
vii)	Total aflatoxins, µg/kg, *Max*	20	20	20	20	20	20	IS 16287
viii)	Aflatoxin B_1, µg/kg, *Max*	10	10	10	10	10	10	IS 16287

NOTE — Cocoa solids content shall be calculated from records maintained by the manufacturer.

Table 2 Microbiological Requirements for Chocolates
(*Clause* 5.5)

Sl No.	Characteristic	Requirement	Method of Test, Ref to
(1)	(2)	(3)	(4)
i)	*Staphylococcus aureus*	Absent/10 g	IS 5887 (Part 8/Sec 1* or 2)
ii)	*Salmonella*	Absent/25 g	IS 5887 (Part 3/Sec 1)
iii)	*E. coli*	Absent/10 g	IS 16424
iv)	Yeast and mould count, *Max*	100/g	IS 16069 (Part 1 or Part 2)

NOTE — In case of dispute, the method indicated by '*' shall be the referee method.

ANNEX A

(*Clause* 2)

LIST OF REFERRED STANDARDS

IS No.	*Title*
IS 265 : 2021	Hydrochloric acid — Specification (*fifth revision*)
IS 376 : 2023	Sodium hydroxide, analytical reagent — Specification (*fourth revision*)
IS 548 (Part 1/ Sec 2) : 2020	Method of sampling and test for oils and fats: Part 1 Sampling, physical and chemical tests, Section 2 Physical and chemical tests
IS 1070 : 1992	Reagent grade water (*third revision*)
IS 2491 : 2013	Food hygiene — General principles — Code of practice (*third revision*)
IS 4905 : 2015/ ISO 24153 : 2009	Random sampling and randomization procedures (*first revision*)
IS 5887	Methods for detection of bacteria responsible for food poisoning:
(Part 3/Sec 1) : 2020/ ISO 6579-1 : 2017	Horizontal method for the detection, enumeration and serotyping of Salmonella, Section 1 Detection of Salmonella spp. (*third revision*)
(Part 8/Sec 1) : 2002/ ISO 6888-1: 1999	Horizontal method for enumeration of coagulase-positive Staphylococci (*Staphylococcus aureus* and other species), Section 1 Technique using Baird-Parker agar medium
(Part 8/Sec 2) : 2002/ISO 6888-2 : 1999	Horizontal method for enumeration of coagulase-positive (*Staphylococcus aureus* and other species), Section 2 Technique using rabbit plasma fibrinogen agar medium
IS 7224 : 2006	Iodized salt, vacuum evaporated iodized salt and refined iodized salt — Specification (*second revision*)
IS 16069	Microbiology of food and animal feeding stuffs — Horizontal method for the enumeration of yeasts and moulds;
(Part 1) : 2013/ ISO 21527-1 : 2008	Colony count technique in products with water activity greater than 0.95
(Part 2) : 2013/ ISO 21527-2 : 2008	Colony count technique in products with water activity less than or equal to 0.95
IS 16287 : 2015/ ISO 16050 : 2003	Foodstuffs — Determination of aflatoxin B_1, and the total content of aflatoxins B_1, B_2, G_1 and G_2 in cereals, nuts and derived products — High performance liquid chromatographic method
IS 16424 : 2016/ ISO 7251 : 2005	Microbiology of food and animal feeding stuffs — Horizontal method for the detection and enumeration of presumptive *Escherichia coli* — Most probable number technique

ANNEX B

[*Table* 1, *Sl No*. (i)]

DETERMINATION OF TOTAL FAT

B-1 APPARATUS

B-1.1 Buchner Funnel — of 9 cm size

B-1.2 Soxhlet Apparatus, with 250 ml flat-bottom flask.

B-2 REAGENTS

B-2.1 Hydrochloric Acid — sp gr 1.16 (*see* IS 265).

B-2.2 Filter-Aid.

B-2.3 Petroleum Ether — redistilled below 60 °C.

B-2.4 Sodium Sulphate — anhydrous.

B-3 PROCEDURE

B-3.1 Preparation of Sample

Melt the product in a beaker at a temperature not exceeding 45 °C. Pour the melted sample on a marble slab and mix thoroughly with a spatula till product is solidified. Use this prepared sample, in the various tests.

B-3.2 Weigh accurately about 10 g to 20 g of the prepared sample into a 400 ml beaker and add 30 ml of water and 25 ml of hydrochloric acid. Heat for 30 minutes on a steam-bath, with stirring. Add 5 g of filter-aid and 50 ml of ice-cold water and chill for 30 minutes in ice-cold water. Fit a heavy piece of linen into the Buchner funnel and moisten with water. Apply gentle suction and pour over it a suspension of 3 g of filter-aid in 30 ml of water. Filter the hydrolyzed mixture by gentle suction, rinsing the beaker three times with ice-cold water, taking care to leave a layer of liquid on the filter. Finally wash three times with ice-cold water and suck dry. Transfer the filter-cake from the funnel to the original beaker, using a small piece of filter paper to transfer any material adhering to the funnel. Wash the funnel with petroleum ether into the beaker and evaporate the ether on a steam-bath. Break up the cake with a glass rod and allow it to remain on the steam bath until the contents are so dry as to enable pulverizing easily. Place in an oven at 100 °C ± 2 °C for one hour. Add 15 g of powdered anhydrous sodium sulphate and mix well.

B-3.3 Transfer the mixture to the fat-extraction thimble of the Soxhlet apparatus. Wash the beaker with 50 ml of petroleum ether and transfer the washings to the thimble. Extract the fat with petroleum ether so that at least 300 ml have been circulated. Transfer the extract to a tared dish and evaporate the petroleum ether on a steam-bath. Dry the fat till the difference in mass between two successive weighings is not more than one milligram.

NOTE — In the case of plain covering chocolate, extract the fat in a Soxhlet apparatus as prescribed in **B-3.3** using 10 g of the prepared sample (**B-3.1**).

B-4 CALCULATION

$$\text{Total fat (on moisture free basis)} = \frac{1\,000\ m}{M_1\,(1\,000) - M_2}$$

where

m = mass, in g, of fat;

M_1 = mass, in g, of prepared sample taken for the test; and

M_2 = moisture, percent by mass, in the prepared sample (*see* Annex J).

ANNEX C

[*Table* 1, *Sl No*. (ii)]

DETERMINATION OF MILK FAT

C-1 PROCEDURE

Extract about 7 g of fat from the chocolate sample using Soxhlet extraction method (*see* Annex B). Determine the Reichert Meissel value of the extracted fat as given in **19** of IS 548 (Part 1/Section 2).

C-2 CALCULATIONS

Milk fat (on dry basis), percent by mass =

$$\frac{RV - 0.2}{26} \times F$$

where

RV = Reichert value obtained (*see* **F-1.1**);
F = Total Fat percent in sample (*see* **B-4.1**);
0.2 = Reichert value of cocoa butter; and
26 = Reichert value of milk fat.

ANNEX D

[*Table* 1, *Sl No*. (iv)]

DETERMINATION OF MILK SOLIDS

D-0 Two methods for determination of milk solids have been given.

D-1 METHOD 1

Method 1 is to be used for determination of milk solids for products not heat treated and Method 2 for products which have undergone heat treatment.

D-1.1 Reagents

D-1.1.1 *Petroleum Ether*

D-1.1.2 *Sodium Oxalate Solution* — approximately one percent (m/v).

D-1.1.3 *Glacial Acetic Acid*

D-1.1.4 *Tannic Acid Solution* — approximately 10 percent (*m/v*)

D-1.1.5 *Concentrated Sulphuric Acid* — sp gr 1.84

D-1.1.6 *Catalyst Mixture* — 1.0 g of selenium and 5.0 g of mercuric oxide intimately mixed together.

D-1.1.7 *Alkali Solution* — prepared by dissolving 300 g of sodium hydroxide (*see* IS 376) and 10 g of sodium thiosulphate in 500 ml of water.

D-1.1.8 *Standard Sulphuric Acid* — approximately 0.1 N

D-1.1.9 *Methyl Red Indicator Solution*

Dissolve 1 g of methyl red in 200 ml of rectified spirit (95 percent by volume).

D-1.1.10 *Standard Sodium Hydroxide Solution* — approximately 0.1 N

D-1.2 Procedure

D-1.2.1 Weigh accurately about 10 g of the prepared sample **B-3.1** and extract the fat by shaking and centrifuging with two consecutive portions each of 100 ml of petroleum ether. Remove the last traces of ether from the extracted residue in an air-oven, Shake the defatted residue with 100 ml of water for 4 minutes and then add 100 ml of sodium oxalate solution. Put stopper and shake vigorously for 3 minutes. Allow, this mixture to stand for 10 minutes, shake again for 2 minutes and then centrifuge for 15 minutes. Pipette 100 ml of the clear supernatant liquid into a 250 ml beaker and add one millilitre of glacial acetic acid. Stir gently, allow to stand for a few minutes and then add 4 ml of freshly prepared tannic acid solution and stir. Allow the precipitate to settle and filter through a Whatman filter paper No. 42 overlaid with paper pulp, in a 7 cm Buchner funnel. Wash twice with the sodium oxalate solution containing one percent (m/v) of the glacial acetic acid and two percent (m/v) of the tannic acid solution.

Digest the precipitate in a Kjeldahl flask with 20 ml of sulphuric acid, 15 g of sodium sulphate and 1 g of the catalyst, for 30 minutes after the mixture has become clear. Cool the contents of the flask. Transfer quantitatively to a round-bottom flask, with water, the total quantity of water used being about 200 ml. Add with shaking a few pieces of pumice stone to prevent bumping. Add 50 ml of the alkali solution (**D-1.1.7**) carefully over the side of the flask so that it does not mix at once with the acid solution but forms layer below the acid. Assemble the apparatus, taking care that the tip of the condenser extends below the surface of the sulphuric acid contained in the beaker. Mix the contents of the flasks by shaking and distil until all ammonia has distilled over into the standard sulphuric acid. Detach the flask from the condenser and shutoff the burner. Rinse the condenser thoroughly with water into the beaker. Wash the tip carefully so that all traces of condensate are transferred to the beaker. When all the washings have drained into the beaker, add two or three drops of the methyl red indicator solution and titrate standard sodium hydroxide solutions.

D-1.2.2 Carry out a blank using all reagents in the same quantities but without the material to be tested.

D-1.3 Calculation

Non-fat milk solids, percent by mass =

$$\frac{3\ 126.2\ (B - A)\ N}{M}$$

where

B = volume, in ml, of standard sodium hydroxide solution used to neutralize the acid in the blank determination;

A = volume, in ml, of standard sodium hydroxide solution used to neutralize the excess of acid in the test with the material;

N = normality of the standard sodium hydroxide solution; and

M = mass, in g, of the material taken for the test.

D-2 METHOD 2

D-2.0 Principle

The method involves dissolution of the lactose and sucrose and clarification of the resulting solution, the reducing sugar content (calculated as lactose) is then determined using the Lane and Eynon's volumetric copper reduction procedure.

D-2.1 Reagents

D-2.1.0 All reagent shall be of analytical reagent grade.

D-2.1.1 *Neutral Lead Acetate* [$(CH_3COO)_2$ $Pb.3H_2O$] — 100 g/litre

D-2.1.2 *Potassium Oxalate*

D-2.1.3 *Fehling's Solution* (*Soxhlet Modification*) — prepared by mixing immediately before use, equal volumes of solution A and solution B.

D-2.1.3.1 *Solution A*

Dissolve 34.639 g of copper Sulphate ($CuSO_4.5H_2O$) in water, add 0.5 ml of concentrated sulphuric acid of sp gr 1.84 and dilute to 500 ml in a graduated flask. Filter the solution through prepared asbestos.

D-2.1.3.2 *Solution B*

Dissolve 173 g of potassium sodium tartrate ($KNaC_4H_4O_6$, $4H_2O$) Rochelle salt and 50 g of sodium hydroxide analytical reagents, in water. Dilute to 500 ml in a graduated flask and allow the solution to stand for two days. Filter this solution through prepared asbestos.

D-2.1.3.3 *Standardization of Fehling's solution*

Accurately pipette 5 ml each of Fehling's A and B solutions into a 250 ml Erlenmeyer flask containing anti-bumping granules. Add from a burette 15 ml of standard dextrose solution, bring the cold mixture to boil and boil for 2 minutes. Add 5 drops of methylene blue solution and continue adding increments of dextrose solution at 10 seconds to 15 seconds intervals until the blue colour is discharged, the total boiling time being less than 4 minutes. Keep the contents of the flask boiling throughout the titration, the continuous emission of steam preventing reoxidation of the copper or indicator. Deduct 0.5 ml from this preliminary titration, add this volume of cold standard dextrose solution to fresh aliquots of mixed Fehling's solutions and repeat the standardization twice more. Wash the used flask with tap water, remove the cuprous oxide deposit with a small quantity of dilute nitric acid (it is not necessary to use fresh nitric acid each time) and rinse the flask well with water. Calculate the mean titration from the two accurate determinations, ignoring the preliminary titration.

Multiply the titre (obtained by direct titration) by the number of milligrams of anhydrous dextrose in 1 ml

of the standard dextrose solution to obtain the dextrose factor. Compare this factor with the dextrose factor given in Table 3 and determine the correction if any to the dextrose factor derived from the table. The correction factor is obtained by subtracting the dextrose factor derived from the table, from the calculated dextrose factor.

D-2.1.4 *Standard Dextrose Solution*

Dry anhydrous dextrose in a vacuum oven at 70 °C. Weigh accurately about 0.5 g of dried anhydrous dextrose in a 200 ml volumetric flask. Dissolve in water and make up the volume to the mark.

D-2.1.5 *Methylene Blue Indicator Solution*

Dissolve 1 g of methylene blue in water and dilute to 100 ml.

D-2.1.6 *Petroleum Ether* — redistilled below 6 °C

D-2.2 Procedure

D-2.2.1 *Preparation of Solution*

Weigh accurately about 10 g of a representative sample of grated chocolate, into a 150 ml beaker. Heat for a few minutes on a boiling water bath and when the fat has melted, add a few ml of water at not less than 80 °C and mix, using a small round-ended glass rod, to a smooth paste. Add a few more millilitres of hot water and mix again in the same way. Continue this dilution and mixing until a thin suspension entirely free from lumps has been obtained and the volume is about 70 ml. Add 5 ml of neutral lead acetate solution, mix well and belt for a further 5 minutes on the water bath. Filter through a 150 mm Whatman No. 1 paper, collecting the filtrate in a 200 ml volumetric flask. Wish the residue on the paper 2 to 3 times with boiling water. Transfer the residue back to the original beaker, washing it from the filter into the beaker with a jet of hot water from wash bottle, preferably fitted with a bunsen-valve or similar device. Suspend the residue in 50 ml to 60 ml of hot water. Mix well and heat for 5 minutes on a hot water bath. Filter to same paper as before, collecting the filtrate in the same 200 ml flask. Wash the residue with hot water, allowing the residue to drain completely between washing, until the volume of the titrate and washing is about 180 ml. Cool the filtrate to room temperature. Add 0.5 g of potassium oxalate, dilute to volume, mix well and allow to stand for 15 minutes to 20 minutes, mixing occasionally. Filter through a dry 150 mm Whatman No. 1 filter paper collecting the filtrate in a clean, dry flask and rejecting the first few ml of filtrate. Dilute 50 ml of the filtrate to 100 ml in a volumetric flask. Titrate this solution obtained with Fehling's solution using the procedure given under **D-2.1.3.3** (using the above solution in place of dextrose solution). Let the reading be V_1.

D-2.3 Calculation

D-2.3.1 Refer to Table 3 and note down the mg of Lactose monohydrate corresponding to the reading V_1. Let the value be m.

D-2.3.2 Lactose, percent by mass = $\frac{(m+f)}{V_1} \times \frac{40}{M}$

where

M = mass, in g, of chocolate sample taken;
f = Correction factor (*see* **D-2.1.3.3**); and;
m = mass, in mg, of lactose monohydrate corresponding to the reading V_1 from Table 3.

NOTE — The method is only applicable if the sample contains no reducing sugars other than lactose.

D-2.3.3 *Non-fat Milk Solids* =

Lactose, percent by mass $\times \frac{24}{13}$

NOTE — The above formula is derived from Vieth's ratio, that is, lactose: protein: ash = 13 : 9 : 2.

Table 3 Total Reducing Sugar Required for Complete Reduction of 10 ml Soxhlet Solution
(*Clause* D-2.3.2)

Sl No.	Titre	Invert Sugar No Sucrose	g Sucrose/100 ml Invert Sugar				Lactose	
			1	5	10	25	Anhydrous	$C_{12}H_{22}O_{11}.H_2O$
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	15	50.5	49.9	47.6	46.1	43.4	64.9	68.3
ii)	16	.6	50.0	.6	.1	.4	.8	.2
iii)	17	.7	.1	.6	.1	.4	.8	.2
iv)	18	.8	.1	.6	.1	.3	.7	.1
v)	19	.8	.2	.6	.1	.3	.7	.1
vi)	20	.9	.2	.6	.1	.2	.6	.0
vii)	21	51.0	.2	.6	.1	.2	.6	.0
viii)	22	.0	.3	.6	.1	.1	.6	.0
ix)	23	.1	.3	.6	.1	.0	.5	67.9
x)	24	.2	.3	.6	.1	.9	.5	.9
xi)	25	.2	.4	.6	.0	.8	.5	.9
xii)	26	.3	.4	.6	.0	.8	.5	.9
xiii)	27	.4	.4	.6	.0	.7	.4	.8
xiv)	28	.4	.5	47.7	.0	.7	.4	.8
xv)	29	.5	.5	.7	.0	.6	.4	.8
xvi)	30	.5	.5	.7	.0	.5	.4	.8
xvii)	31	.6	.6	.7	45.9	.5	.4	.8
xviii)	32	.6	.6	.7	.9	.4	.4	.8
xix)	33	.7	.6	.7	.9	.3	.4	.8
xx)	34	.7	.6	.7	.8	.2	.4	.9
xxi)	35	.8	.7	.7	.8	.2	.5	.9
xxii)	36	.8	.7	.7	.8	.1	.5	.9
xxiii)	37	.9	.7	.7	.7	.0	.5	.9
xxiv)	38	.9	.7	.7	.7	.0	.5	.9
xxv)	39	52.0	.8	.7	.7	41.9	.5	.9
xxvi)	40	.0	.8	.7	.6	.8	.5	.9
xxvii)	41	.1	.8	.7	.6	.8	.6	68.0
xxviii)	42	.1	.8	.7	.6	.7	.6	.0
xxix)	43	.2	.8	.7	.5	.6	.6	.0
xxx)	44	.2	.9	.7	.5	.5	.6	.0
xxxi)	45	.3	.9	.7	.4	.4	.7	.1
xxxii)	46	.3	.9	.7	.4	.4	.7	.1
xxxiii)	47	.4	.9	.7	.3	.3	.8	.2
xxxiv)	48	.4	.9	.7	.3	.2	.8	.2
xxxv)	49	.5	.0	.7	.2	.1	.8	.2
xxxvi)	50	.5	.0	.7	.2	.0	.9	.3

ANNEX E

[*Table* 1, *Sl No*. (v)]

DETERMINATION OF SUGAR (SUCROSE)

E-1 REAGENTS

All reagents shall be of analytical reagent grade.

E-1.1 Neutral Lead Acetate Solution [$(CH_3COO)_2$ Pb.$3H_2O$] — 100 g/litre

E-1.2 Citric Acid

E-1.3 Fehling's Solutions — as specified in **D-2.1.3**

E-2 PROCEDURE

E-2.1 Weigh accurately 10 g of a representative sample of grated chocolate, into 150 ml beaker. Heat for a few minutes on a boiling water bath and when the fat has melted, add a few ml of water at not less than 80 °C and with the help of a small round-ended glass rod, mix to a smooth paste. Add a few more millilitre of hot water and mix again in the same way. Continue this dilution and mixing until a thin suspension entirely free from lumps has been obtained and the volume is about 70 ml. Add 5 ml of neutral lead acetate. Mix well and heat for a further 5 minutes on the water bath. Filter through a 150 mm Whatman No. 1 paper, collecting the filtrate in 200 ml volumetric flask. Allow the residue to drain well. Wash twice with boiling water using a wash bottle preferably fitted with a Bunsen valve or similar device, transfer the residue and paper back to the original beaker. Suspend the residue and paper in 50 ml to 60 ml of hot water, breaking up the paper by stirring, and heat for 5 minutes on hot water bath. Fit a new paper to the funnel, wet with a minimum of water, and filter the suspension, collecting the filtrate in the same 200 ml flask. Wash the residue with hot water, allowing the residue to drain completely between washing, until the volume of the filtrate and washing is about 180 ml. Cool the filtrate to room temperature, add 0.5 g of potassium oxalate, dilute the volume and mix well. Allow to stand for 15 minutes to 20 minutes mixing occasionally. Filter through a 150 mm dry filter paper, collecting the filtrate in clean dry flask (A) and rejecting the first few millilitres of filtrate. Dilute 50 ml of filtrate collected to 100 ml in a volumetric flask. Titrate this solution with 10 ml Fehling's solution. Let the reading be 'a' ml. Pipette out 50 ml of filtrate at A in a 150 ml of conical flask containing 1 g of citric acid and anti-bumping glass beads. Mark the level of solution in the flask with a marker. Insert a small funnel into the neck of the flask and heat it over a flame. Boil for 1 hour replacing the water lost by evaporation. Cool the solution after boiling and neutralize with 10 percent NaOH using phenolphthalein indicator. Dilute to 100 ml in volumetric flask. Pipette out 20 ml of this solution and dilute to 100 ml in a volumetric flask. Titrate with 10 ml Fehling's solution. Let the reading be 'b' ml.

E-2.2 Calculation

E-2.2.1 Free reducing sugar, percent by mass (X) =

$$\frac{(m_1 + f)}{a} \times 4$$

where

m_1 = mass, in mg, of invert sugar of Table 3 corresponding to reading 'a' ml;
F = Correction factor (*see* **D-2.1.3.3**) ml; and
'a' = titrate reading obtained before inversion.

E-2.2.2 Reducing sugar, as invert sugar percent by mass (Y) =

$$\frac{(m_2 + f)}{b} \times 20$$

where

m_2 = mass, in mg, of invert sugar of Table 3 corresponding to reading 'b'.
f = Correction factor (*see* **D-2.1.3.3**) ml; and
'b' = titrate reading obtained after inversion.

E-2.2.3 Sucrose, percent by mass = (Y − X) × 0.95

ANNEX F

[*Table* 1, *Item* (vi)]

DETERMINATION OF ACID INSOLUBLE ASH

F-1 REAGENT

F-1.1 Dilute Hydrochloric Acid — approximately 5 N, prepared from concentrated hydrochloric acid (*see* IS 265).

F-2 PROCEDURE

Weigh accurately about 10 g of the material in a porcelain dish. Heat at 100 °C until water is expelled and then heat slowly over a flame until swelling ceases. Ignite in a muffle furnace at 550 °C until grey ash results. Remove the dish from the furnace and allow to cool to room temperature. Add 25 ml of dilute hydrochloric acid, to the dish, cover with a watch-glass and heat on a water-bath for 10 minutes. Allow to cool and filter the contents of the dish through Whatman paper No. 42 or its equivalent. Wash the filter piper until the washings are free from the acid. Return the filter paper and residue to the dish. Keep it in an electric air-oven maintained at 135 °C ± 2 °C for about 3 hours. Ignite in a muffle furnace at 550 °C for one hour. Cool the dish in a desiccator and weigh. Repeat the process of igniting in a muffle furnace, cooling and weighing at half-hour intervals until the difference in mass between two successive weighings is less than one milligram. Note the lowest mass.

F-3 CALCULATION

Acid insoluble ash (on moisture-, fat- and sugar-free basis), percent by mass = $\frac{10\,000\,m}{M_1\,[100-(M_2+F+S)}$

where

m = mass, in g, of the acid insoluble ash;
M_1 = mass, in g, of the prepared sample taken for the test;
M_2 = moisture, percent by mass, in the prepared sample (*see* Annex J);
F = fat (on as in basis), percent by mass, in the prepared sample (**B-4**); and
S = sugar (on the basis), percent by mass, in the prepared sample (**E-2.2.3**).

ANNEX G

(*Clause* 5.3.2)

DETERMINATION OF CHOCOLATE COMPONENT OF FILLED CHOCOLATE

G-1 PROCEDURE

Weigh to the nearest 0.1 g, 500 g of the filled chocolate. Scrape the chocolate coating and separate the filling. Weigh the filling to the nearest 0.1 g.

G-2 CALCULATION

Chocolate component, percent by mass =

$$\frac{M_1 - M_2}{M_1} \times 100$$

where

M_1 = mass, in g, of the filled chocolate taken for the test; and
M_2 = mass, in g, of the filling.

ANNEX H

(*Clause* 5.4.1)

DETERMINATION OF EDIBLE WHOLESOME SUBSTANCES

H-1 PROCEDURE

Weigh to the nearest 1.0 g, 500 g of the product containing fruits, nuts etc. Break the Simple into small pieces and place them in a 1 litre glass/metal container. Cover the sample with melted cocoa butter and place container in a warm oven until the added ingredients can be separated upon stirring. Sieve contents through a 20 mesh sieve and allow the liquid to drain completely. Next soak the sieve containing ingredients in trichloroethylene and stir gently for a minute or two. Remove cleaned nuts, fruits, etc onto a tray and let the solvent evaporate. Weigh to the nearest 0.1 g.

H-2 CALCULATION

Wholesome ingredients, percent by mass = $\frac{M}{X} \times 100$

where

M = mass, in g, of residue; and
X = mass, in g, of sample taken for test.

ANNEX J

(*Clause* B-4)

DETERMINATION OF MOISTURE

J-1 PROCEDURE

Weigh accurately about 10 g of the prepared sample in a weighing bottle having a diameter of about 40 mm and a height of about 25 mm. Distribute the material as evenly as possible over the bottom of the bottle by gentle tapping. Place the bottle in a vacuum oven, remove the cover of the bottle and dry the material for six hours at 80 °C ± 1 °C at a pressure not exceeding 5 mm of mercury. Allow the bottle to cool to room temperature and weigh.

J-2 CALCULATION

Moisture, percent by mass = $\frac{100\,(M - M_1)}{M}$

where

M = mass, in g, of the prepared sample taken for the test; and
M_1 = mass, in g, of the material after drying.

ANNEX-K

(*Clause* 7)

SAMPLING OF CHOCOLATE

K-1 GENERAL REQUIREMENTS OF SAMPLING

K-1.0 In drawing, preparing, storing and handling Samples, the following precautions and directions given shall be observed.

K-1.1 Samples shall be taken in a protected place not exposed to damp air, dust or soot.

K-1.2 The sampling instrument; preferably a spoon or spatula, shall be clean and dry when used. When taking samples for microbiological examination, it shall be sterile.

K-1.3 The samples, the material being sampled, the sampling instrument and the containers for samples, shall be protected from adventitious contamination.

K-1.4 The samples shall be placed in clean and dry glass or tin containers. The samples containers shall be of a size that they lie almost completely filled by the sample. The sample containers shall, in addition, being sterile when they are used for samples for microbiological examination.

K-1.5 Each container shall be sealed air-tight after filling and marked with full details of sampling, batch or code number, name of the manufacturer,

sub-group number and other important particulars of the consignment and lot.

K-1.6 Samples shall be stored in such a manner that the temperature of the material does not vary unduly from the normal temperature and that they protected from light

K-2 SCALE OF SAMPLING

K-2.1 Lot

All the containers of the same size in a single consignment of material drawn from a single batch of manufacture shall constitute a lot.

K-2.2 Samples shall be tested for each lot separately for ascertaining conformity of the materials to the requirements of this specification. The total number of containers to be selected from the lot shall depend on the size of the lot and shall be in accordance with Table 4.

K-2.2.1 These containers shall be chosen at random from the lot. In order to ensure randomness of selection, procedures given in IS 4905 may be followed.

K-3 TEST SAMPLES AND REFEREE SAMPLES

K-3.1 Each sample container of net content 500 g or more selected according to **K-2.2** and col (2) and (3) of Table 4 shall be treated as one group.

K-3.2 Preparation of Individual Samples

Melt the contents of container at 55 °C and mix thoroughly. Withdrawn not less than 500 g of the melted material while mixing representative portion. About 250 g of the material shall be taken from this and divided into three equal parts. Each part, so obtained, shall be transferred to a sample container which shall be scaled air-tight and labelled with the particulars given in **K-1.5**. The samples so obtained shall be divided into three sets in such a way that each set has a sample representing each group. One of these sets shall be marked for the purchaser, one for the vendor and the third for the referee.

K-3.3 Preparation or a Composite Sample

From the mixed material of each group remaining after taking the sample in **K-3.2** or from the containers chosen in Table 3, equal quantities of material shall be taken and mixed up together so as to form a composite sample representing the lot as a whole and weighing not less than 200 g. This composite Simple shall be divided into three equal parts and transferred to clean, dry sample containers and labelled with all the particulars given in **K-1.5**. One of these composite samples representing the lot as a whole shall be for the purchaser, another for the vendor and the third for the referee.

K-3.4 From the containers selected according to Table 4, the number of containers given in Table 4 shall be randomly selected. Draw with a suitable sampling instrument which is sterile, the representative quantity of material under aseptic conditions to form a sample of container for microbiological examination. Divide the sample (taking care not to bring a microbiological contamination in the material into three equal parts. Each part so obtained shall constitute a test sample representing the container and shall be transferred to sterile containers, sealed airtight and labelled with full identification particular given in **K-1.5**. These shall be marked, in addition, with the words 'For Microbiological Examination'. The sample so obtained shall be divided into three sets in such way that each set has a sample representing each selected container. One of these sets shall be marked for the purchaser, another for the vendor and the third for the referee.

K-3.5 Referee Sample

Referee samples for a lot shall consist of a set of individual Samples, the composite sample and a set of samples for microbiological examination marked for this purpose and shall bear the seals of the purchaser and the vendor. These shall be kept at a place and under conditions agreed to between the purchaser and the vendor to be used in case of a dispute between the two.

K-4 NUMBER OF TESTS

K-4.1 The tests for determination of the requirements given in Table 1 and **5.3** and **5.4** shall be conducted on the individual samples as obtained in **K-3.2**.

K-4.2 The tests for the description shall be made on the composite sample as prepared under **K-3.3**.

K-4.3 Test for *Staphylococcus, Salmonella*, *E. coli* and yeast and mould count shall be conducted on each of the samples constituting a set of test samples labelled with the words 'For Microbiological Examination'.

K-5 CRITERIA FOR CONFORMITY

K-5.1 For Individual Samples

The lot shall be declared to satisfy the requirements given in Table 1 and **5.3** and **5.4**, if each of the test

results satisfies the corresponding requirements given in Table 1, **5.3** and **5.4**.

K-5.2 For Composite Samples

The composite sample shall meet corresponding requirements as given in **5.1**.

K-5.3 For Samples Examination for Microbiological Examination

The test results on the sample for microbiological examination shall meet the corresponding requirements specified in Table 2.

Table 4 Sampling or Containers of Net Content 500 g or More
(*Clause* K-2.2)

Sl No.	Number of Container in Lot	Sample Size (for Test Other than Microbiological)	Sub-Sample Size (for Microbiological)
(1)	(2)	(3)	(4)
i)	Up to 50	2	2
ii)	51 to 300	3	2
iii)	301 to 500	4	2
iv)	501 to 1 000	5	3
v)	1 001 to above	6	3

ANNEX L

(*Foreword*)

COMMITTEE COMPOSITION

Stimulant Foods Sectional Committee, FAD 06

Organization	*Representative(s)*
Tea Board India, Kolkata	SHRI S. SOUNDARARAJAN **(*Chairperson*)**
Agricultural and Processed Food Products Export Development Authority (APEDA), New Delhi	SHRI DEVENDRA PRASAD
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Confederation of Indian Food Trade & Industry (CIFTI-FICCI), New Delhi	MS RANJEET KAUR MS MANOJ MEHTA (*Alternate*)
Consumer Guidance Society of India (CGSI), Mumbai	DR SITARAM DIXIT
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Food Safety & Standards Authority of India (FSSAI), New Delhi	MS APOORVA SRIVASTAVA
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Indian Tea Association, Kolkata	SHRI ARIJIT RAHA SHRI SUJIT PATRA (*Alternate*)

Organization	*Representative(s)*
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The United Planters' Association of Southern India (UPASI) Tea Research Foundation, Valparai	DR R. VICTOR J. ILANGO DR BOOPATHIRAJ (*Alternate*)
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This Indian Standard has been developed from Doc No.: FAD 06 (17095).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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Published by BIS, New Delhi